

"अंतरी पेटवु लामज्योत"
उत्तर महाराष्ट्र विद्यापीठ, जळगांव.

उमवि/12/26/News/11/1108/98

16.1.1998

प्रति.

उपविशी संलग्नीत असलेल्या सर्व कला, विज्ञान व
वाणिज्य महाविद्यालयांचे मा. प्राचार्य.

यांनी-

विषय :- प्रथमवर्ष विज्ञान वर्गातील प्राणीशास्त्र व वनस्पतीशास्त्र विषयाचा
अभ्यासक्रमबाबत.

संदर्भ :- उमविचे परिपत्रक क्र. 46/97, दिनांक 9.5.1997.

महोदय.

उपविशी संलग्नीत असलेल्या सर्व कला, विज्ञान व वाणिज्य महाविद्यालयांचे मा. प्राचार्य यांना
निवेदन आहे की, मा. विद्यापीठ अधिकार मंडळाने घेतलेल्या निर्णयानुसार सन 1997-98 या शैक्षणिक
वर्षापासून प्रथमवर्ष विज्ञान वर्गातील प्राणीशास्त्र व वनस्पतीशास्त्र विषयांसाठी नविन सुधारित
अभ्यासक्रम अंमलात आलेला असून, सदरचा नविन अभ्यासक्रम विद्यापीठाचे उपरोक्त परिपत्रकान्वये
आपलास यापूर्वीच पाठविण्यात आलेला आहे. तथापी सदर अभ्यासक्रमात ब-याच प्रमाणात
टंकलेखनाच्या स्वरूपात अडथळे असल्यामुळे संबंधित अभ्यासमंडळाने दुरुस्त केलेला अभ्यासक्रम
विद्यापीठास सादर केलेला आहे. सदर दुरुस्त केलेल्या अभ्यासक्रमाची प्रत यापत्रासोबत आपल्या
कादिलीसाठी पाठविली आहे.

कारिता, सर्व कला, विज्ञान व वाणिज्य महाविद्यालयांचे मा. प्राचार्य यांना विनंतीपूर्वक
कळविण्यात येते की, प्रथमवर्ष विज्ञान वर्गातील प्राणीशास्त्र व वनस्पतीशास्त्र विषयाचा उपरोक्त
संदर्भित परिपत्रकान्वये यापूर्वी पाठविलेला अभ्यासक्रम आता रद्द समजण्यात यावा. तसेच
यापत्रासोबत जोडलेला दुरुस्त केलेला अभ्यासक्रम व यापत्राचा आशय आपल्या महाविद्यालयातील
संबंधित विषयाचे प्राध्यापक व विद्यार्थी यांच्या नजरेस आणावा.

कळवि.

आपला विश्वास,

उपकुलसचिव.

प्रत माहितीसाठी सादर :-

- 1) मा. लेअरमन व सर्व सदस्य, प्राणीशास्त्र व वनस्पतीशास्त्र
अभ्यासमंडळ, उमवि, जळगांव.
- 2) मा. परीक्षा नियंत्रक, उमवि, जळगांव.
- 3) मा. उपकुलसचिव, परीक्षा-पूर्वार्ध, उत्तरार्ध विभाग, उमवि, जळगांव.
- 4) मा. सहा. कुलसचिव, परीक्षा-पूर्वार्ध, उत्तरार्ध विभाग, उमवि, जळगांव.
- 5) मा. गीनाभर, संगणक विभाग, उमवि, जळगांव.

NORTH MAHARASHTRA UNIVERSITY, JALGAON
 SYLLABUS TO BE IMPLEMENTED FROM JUNE 1997
 F.Y.B.SC. - BOTANY
 PAPER-I BOT-1.1 CRYPTOGRAMS
 FIRST TERM
 LOWER CRYPTOGRAMS

TOTAL PERIODS 36

I)	VIRUSES 1) Introduction, structure and characters. 2) Reproduction 3) Diseases- i) Plant diseases- a) Yellow vein mosaic of Lady's finger. b) Leaf curl disease of Tomato ii) Human diseases- a) AIDS b) Polio	3
II)	BACTERIA 1) Introduction - General Characters 2) Structure 3) Classification on the basis of shape 4) Reproduction 5) Economic importance including- i) Plant diseases - a) Citrus canker b) Blackman disease of cotton ii) Human diseases a) Tuberculosis b) Typhoid Emphasizing causal organisms & symptoms.	4
III)	ALGAE 1) Introduction i) General characters of algae ii) Habit and Habitat iii) Structure of thallus iv) Reproduction v) Economic importance 2) Classification of Algae with reasons according to G.M. Smith upto classes giving at least two examples of each class. 3) Study of life cycle of <u>NOSTOC</u> i) Classification with reasons ii) Occurrence iii) Structure of thallus, ultra structure of cell. iv) Nutrition v) Reproduction vi) Economic importance 4) Study of lifecycle of <u>SARGASSUM</u> i) Classification with reasons ii) Occurrence iii) Structure - External and Internal iv) Nutrition v) Reproduction vi) Alternation of generations vii) Economic importance	4
IV)	FUNGI 1) Introduction i) General characters of Fungi, Mycorrhiza ii) Occurrence iii) Structure iv) Nutrition v) Reproduction vi) Economic importance	4

- 2) Classification of Fungi with reasons according to G.W. Smith upto classes giving at least two examples of each class. 3/4
- 3) Study of life cycle of RHIZOPUS. 3
- i) Classification with reasons
 - ii) Occurrence
 - iii) Structure of thallus
 - iv) Nutrition
 - v) Reproduction
 - vi) Economic importance
- 4) Study of life cycle of AGARICUS 4
- i) Classification with reasons
 - ii) Occurrence
 - iii) Structure - Internal and External
 - iv) Nutrition
 - v) Reproduction
 - vi) Economic importance.

**SECOND TERM
HIGHER CRYPTOGRAMS**

TOTAL PERIOD-36

- | | | |
|-----|--|---|
| I) | BRYOPHYTA | 2 |
| 1) | Introduction | 2 |
| | i) Distinguishing features of the group | |
| | ii) Alternation of generations | |
| 2) | Classification of Bryophytes with reasons according to G.M. Smith upto classes giving atleast two examples of each class. | 4 |
| 3) | Study of life cycle of <u>RICCIA</u> . | 6 |
| | i) Classification with reasons | |
| | ii) Habit and Habitat | |
| | iii) External and Internal structure of sporophyte | |
| | iv) Reproduction | |
| | v) Position and structure of sex organs (Development not expected) | |
| | vi) Fertilization | |
| | vii) Structure of sporophyte (Development not expected) | |
| | viii) Structure and germination of spores | |
| | ix) Alternation of generations. | |
| 4) | Study of life cycle of <u>FUNARIA</u> | 6 |
| | i) Classification with reasons | |
| | ii) Habit and Habitat | |
| | iii) External and Internal structure of gametophyte | |
| | iv) Reproduction | |
| | v) Position and structure of sex organs (Development not expected) | |
| | vi) Fertilization | |
| | vii) Structure of sporophyte (Development not expected) | |
| | viii) Structure and germination of spores. | |
| | ix) Alternation of generations. | |
| II) | PTERIDOPHYTA | 2 |
| 1) | Introduction | 2 |
| | i) Distinguishing features of the group. | |
| | ii) Alternation of generations | |
| 2) | Classification of pteridophytes with reasons according to G.M. Smith upto classes mentioning atleast two examples of each class. | 4 |
| 3) | Study of life cycle of <u>SELAGINELLA</u> . | 6 |
| | i) Classification with reasons | |
| | ii) Habit and Habitat | |
| | iii) External and Internal structure of gametophyte | |
| | iv) Reproduction | |
| | v) Position and structure of | |
| | a) Strobilus | |
| | b) Sporangium (Development not expected) | |
| | vi) Germination of spores and structure of mature gametophyte. | |
| | vii) Position and structure of sex organs (Development not expected) | |
| | viii) Fertilization | |
| | ix) Structure of mature embryo | |
| | x) Alternation of generations. | |
| 4) | Study of life cycle of <u>EQUISETUM</u> | 6 |
| | i) Classification with reasons | |
| | ii) Habit and Habitat | |
| | iii) External and Internal structure of sporophyte | |
| | iv) Reproduction | |
| | v) Position and structure of | |
| | a) Strobilus | |
| | b) Sporangium (Development not expected) | |
| | vi) Germination of spores and structure of mature gametophyte. | |
| | vii) Position and structure of sex organs (Development not expected) | |
| | viii) Fertilization | |
| | ix) Structure of mature embryo | |
| | x) Alternation of generations. | |

PAPER-II BOT-1.2
MORPHOLOGY AND ANATOMY OF ANGIOSPERMS AND CELL BIOLOGY
FIRST TERM
MORPHOLOGY AND ANATOMY OF ANGIOSPERMS

TOTAL PERIODS-35

I)	MORPHOLOGY	2
1)	Introduction	
	i) Plant body : Root system and shoot system	
	ii) Definition, distinguishing characters and functions of	
	a) Root b) Stem.	
2)	Leaf	4
	i) Definition, parts of typical leaf	
	ii) Stipules	
	iii) Venation	
	iv) Modifications of lamina	
	v) Simple and compound leaf	
	vi) Phyllotaxy	
	a) Alternate - Distichous, Tristichous, Pentastichous, octastichous.	
	b) Opposite - Superposed, Decussate	
	c) Whorled.	
3)	Inflorescence	4
	i) Definition	
	ii) Types-	
	a) Racemose, b) Cymose, c) Special-Cyathium, Verticillaster, Hypanthodium	
	iii) Significance of inflorescence.	
4)	Flower	6
	i) Definition	
	ii) Parts of typical flower	
	iii) Hypogyny, Epigyny, Perigyny	
	iv) Calyx	
	v) Corolla	
	vi) aestivation	
	vii) Androecium - cohesion and adhesion	
	viii) Gynoecium - Placentation, Types of ovules.	
5)	Fruit	5
	i) Definition ii) Types-	
	A) Simple fruits	
	a) Dehiscent	
	b) Indehiscent-fleshy and dry.	
	c) Schizocarpic	
	B) Aggregate fruits	
	C) Composite fruits - Sorosis and Syconus.	
II)	ANATOMY	7
1)	Tissues	
	i) Definition	
	ii) Meristems - classification based on position and origin.	
	iii) Permanent tissues	
	a) Simple tissues b) Complex tissues	
	c) Secretory tissues.	
	iv) Types of vascular bundles.	
2)	Primary structure of dicotyledonous (Sunflower)	3
	i) Root ii) Stem iii) Leaf	
3)	Primary structure of Monocotyledonous (Maize)	3
	i) Root ii) Stem iii) Leaf	
4)	Comparative study of dicot and Monocot	2
	i) Root ii) Stem iii) Leaf	

SECOND TERM

CELL BIOLOGY

TOTAL PERIODS-36

I) Definition and scope	1
II) Cell -	3
1) Shape, size and general organization	
2) Types of cell -	
i) Prokaryotic ii) Eukaryotic	
III) Cell-wall-	4
1) Middle lamella, primary wall and secondary wall	
2) Chemical composition	
3) Ultra structure of primary cell wall	
4) Functions.	
IV) Plasma membrane	4
1) Chemical composition	
2) Molecular organization and Ultra structure	
3) Concept of unit membrane	
4) Danielli - Dawson's model	
5) Fluid mosaic model	
6) Functions	
V) Cell organelles.	
1) Endoplasmic reticulum - origin Morphology, Ultrastructure, types and functions.	2
2) Ribosomes- Types, structure chemical composition and functions.	1
3) Golgi complex- Shape, position, organization size, ultrastructure, chemical composition and functions.	2
4) Lysosomes- Shape, size, structure, chemical composition (Enzymes) polymorphism and functions.	1
5) Plastids.	2
a) Types- i) Leucoplasts ii) Chromoplasts	
b) Ultra structure of chloroplasts, origin & functions.	
6) Mitochondria.	3
Size, shape, number, ultrastructure chemical composition and functions.	
7) Nucleus.	3
a) shape, number, size.	
b) Ultrastructure (Interphasic)	
i) Nuclear membrane-pore complex	
ii) Nucleoplasm	
iii) Chromatin - Heterochromatin and Euchromatin	
iv) Nucleolus-Structure, Chemical composition and functions.	
8) Chromosome	6
1) Definition	
ii) Size, shape, number	
iii) Structural organization	
a) Pellicle - Matrix - Chromatid	
b) Chromoneme Paranemic and plectonemic	
c) Centromeres - Types of chromosomes based on centromeric position, arm ratio.	
d) Secondary constriction.	
e) Nucleolar organizer, SAT-chromosome.	
f) Telomeres.	
iv) Giant chromosome-	
a) Polytene, b) Lampbrush	
v) Autosomes and sex chromosomes	
VI) Cell-Division	4
1) Amitosis	
ii) Mitosis - Definition, process and significance.	
iii) Meiosis -Definition, process and significance.	

F.Y.B.Sc. - BOTANY
 PAPER-III BOT. 1.3 : PRACTICALS (BASED ON PAPER I & II)
 P.S. - PERMANENT SLIDES

TOTAL PRACTICALS-21

- 1) Viruse and Bacteria
 - A) A study of following diseases with respect to Name of causal organism and symptoms.
 - i) Yellow vein mosaic of Lady's finger/Leaf curl of Tomato.
 - ii) Citrus canker/Black arm of cotton.
 - B) Gram staining in Bacteria
 - C) P.S. - Different forms of Bacteria
- 2) Study of Mstoc
- 3) Study of Sargassum
 - i) T.S. of axis
 - ii) P.S.-a) T.S. of secondary laterals (Leaf)
 - b) T.S. male conceptacle,
 - c) T.S. female conceptacle
- 4) Study of Rhizopus -
 P.S. - sexual stages (Zygospore)
- 5) Study of Agaricus
 - i) Morphology of sporocarp
 - ii) T.S. of gills
 - iii) P.S. - a) L.S. of Sporocarp, b) T.S. of gills.
 Demonstration Practicals : (Practical Number 6 to 11)
- 6) Morphology of leaf
 - i) Parts of typical leaf
 - ii) Venation
 - iii) Phyllotaxy-
 - A) Alternate
 - B) Opposite-
 - a) Superposed b) Decussate
 - C) Whorled
 - iv) Simple and compound leaf
 - v) Modifications - Nepenthes and Utricularia
- 7) Study of inflorescence (as per theory syllabus)
- 8 & 9) Morphology of flower with reference to
 - i) Calyx ii) corolla iii) Aestivation
 - iv) Androecium v) Gynoecium
 - vi) P.S.-
 - a) Placentation b) Aestivation c) Types of ovules.
- 10 & 11) Morphology of fruits (as per theory syllabus).
- 12) Study of tissues

P.S. - 1) Meristems (L.S. of stem apex)

 - ii) Xylem and phloem (T.S. and L.S.)
 - iii) Types of V.B.
- 13) Primary structure of Root T.S.
 - i) Sunflower ii) Maize
- 14) Primary structure of stem T.S.
 - i) Sunflower ii) Maize iii) P.S. Leaf T.S.
 - a) Sunflower b) Maize.
- 15) Study of Riccia
 - i) Mounting of Rhizoids and scales
 - ii) T.S. of thallus
 - iii) P.S. -
 - a) T.S. of thallus showing antheridia and archegonia.
 - b) T.S. of thallus showing sporophyte.

- 16) Study of Funaria
 i) Mounting of rhizoids, peristome teeth and spores.
 ii) P.S. - a) T.S. of stem
 b) V.S. of thallus showing antheridia and archegonia
 c) V.S. of capsule.
 d) Protonema.
- 17) Study of Selaginella
 i) T.S. of stem. ii) Mounting of spores
 iii) P.S. - a) T.S. of root. b) T.S. of Rhizophore
 c) V.S. of strobilus.
- 18) Study of Equisetum
 i) T.S. of stem passing through the internode
 ii) Mounting of sporangiophore and spores
 iii) P.S. - V.S. of strobilus
- 19) Mounting of
 i) Tomato pulp
 ii) Hydrilla leaf
 iii) P.S. - Polytene chromosome in Chironomus or Drosophila larvae.
- 20) Temporary squash preparation for mitosis using aceto-carmine/aceto orcein stain from onion (Allium cepa).
- 21) Study of different stage of mitosis and meiosis with the help of permanent slides.

COMPULSORY BOTANICAL EXCURSION SHOULD BE ARRANGED

=x=x=

J/WS/EYLL/FYBSCBOT

NORTH MAHARASHTRA UNIVERSITY, JALGAON.
F.Y.B.Sc Zoology Syllabus (June 1997)
Paper I Section I Non chordate I

1. Principles of Classification -
 - i) Importance of Classification
 - ii) Binomial Nomenclature,
 - iii) Concept of species. (Periods 5)

2. Define the following terms with suitable examples :-
 - i) Symmetry types - asymmetry, bilateral symmetry, radial symmetry.
 - ii) diploblastic, iii) Triploblastic, - iv) Pseudo-coelomate,
 - v) Coelomate, vi) Metamerism, vii) Hermaphroditism,
 - viii) Sexual dimorphism, ix) Regeneration (in Hydra & Planaria)
 - x) Polymorphism. (in honey bees) (Periods 5)

3. Study of cockroach *periplaneta americana*.
 - w.r.t. (i) Classification (ii) Habit and Habitat, (1 Period)
 - (iii) External Characters - Head, thorax, abdomen (details of sclerites not expected) wings, legs, sexual dimorphism, body wall & mountings.
 - (iv) Internal Anatomy w.r.t. following systems - Digestive system - food and feeding habits of nutrition structure of alimentary canal and digestion. (3 Periods)

Respiratory system - Spiracles, tracheal system and mechanism (2 Periods)

Circulatory system - Haemocoel, Haemolymph (with haemocyte types), Sinus, Heart, Segmental vessels, dorsal diaphragm, alary muscles, Pericardial cells, Mechanism of circulation of haemolymph. (7 Periods)

Excretory system - Malpighian tubules, structure and functions, Urate cells. (3 Periods)

Nervous system - Structure and functions of Central, Visceral [corpora cardiaca, corpora allata] (3 Periods)

Sense organs - Chemoreceptors, Mechanoreceptors, Auditory - receptors and photoreceptors. (3 Periods)

Reproductive system - Sexual dimorphism, male and female organs, mating, Ootheca, metamorphosis reproductive (5 Periods)

(40 Periods)

Paper I Section II Chordate I

1. General Topics -
 - I) Migration in animals - definition, Migration in Salmon fish (2 Periods)
 - II) Definition of - (a) Herbivorous, (b) Carnivorous, (c) Omnivorous, (d) Sanguivorous, (e) Graminivorous, (f) Insectivorous, (g) frugivorous, (h) Oviparous, (i) Viviparous, (j) Ovoviviparous, viviparous, (k) Neo teny or Paedogenesis, (l) Hibernation, (m) Aestivation - with suitable examples, (3 Periods)
 - III) Parental Cares - In Sea horse and in Pipa. (1 Period)

2. Animal Type - Study of frog (*Rana tigerina*) w.r.t. the following -
 - i) Systematic position, ii) Habits and Habitat, iii) Breeding period, iv) External Characters, v) Internal Anatomy (2 Periods)
 - a) Body wall - structure and functions (1 Period)
 - b) Endoskeleton - axial and appendicular -

- c) Digestive system - Alimentary canal, digestive glands, food, feeding, digestion, absorption, assimilation in brief and ejection (histology of organs not expected) (5 Periods)
 *(Liver, pancreas and glands present in the wall of the alimentary canal)
- d) Respiratory system - organs :- cutaneous respiration, buccal respiration, pulmonary respiration-mechanism. (2 Periods)
- e) Circulatory system - Detailed structure of Heart, composition of blood, Arterial and venous system, of mechanism of circulation (5 Periods)
- f) Excretory system - Detailed structure of kidney, mechanism of excretion. (2 Periods)
- g) Nervous system, Central Nervous system, Peripheral nervous system, Autonomous nervous system. (3 Periods)
- h) Sense organs - Structure and function of Eye and ear. (2 Periods)
- i) Reproductive system - Sexual dimorphism, Male reproductive system, female reproductive system. (2 Periods)
- j) Development- fertilization, Cleavage, Blastula, Gastrula formation, fate of three germ layers, and Metamorphosis. (5 Periods)
-
- (40 Periods)

Paper II

Environmental Biology and Genetics.

Section I - Environmental Biology

1. Introduction : What is an environment ? Concept, Scope and Significance of environmental biology. (2 Periods)
2. Biosphere: Components, Biotic and abiotic factors (8 Periods)
3. Ecosystem : Definition, Names of different ecosystems, Pond as an ecosystem. (2 Periods)
4. Ecological energetic : Food chain, food webs, ecological pyramids. (3 Periods)
5. Environmental adaptations : Definition, Types of Adaptations-
 i) Aquatic - fresh water and marine water, ii) Terrestrial adaptations - Cursoria, fossorial, aerial, arboreal, desert. (6 Periods)
6. Names of Zoo- Geographical regions of world, and the animals found in them. (2 Periods)
7. Animal association : Definition, Homospecific and Heterospecific, Types Commensa, Mutualism, Parasitism. (2 Periods)
8. Resources : Renewable and non-renewable resources, energy crises. (3 Periods)
9. Environmental pollution : Definition, Names of different types of pollutions -
 Air Pollutions - Air pollutants and their impacts on human being.
 Water pollution - water pollutants and their impacts on human being. (8 Periods)

10. Conservation of Nature : Definition,

- i) Preservation of species, extinction of species due to habitat, not required destruction, mass killing,
ii) Wild life conservation acts. (4 Periods)
-
- (40 Periods)

PAPER II

SECTION II - GENETICS

1. Recapitulation : Monohybrid ratio and dihybrid ratio, Concept Gene and mutations in brief. (3 Periods)
2. Interactions of Genes : Types -
i) Complementary factor (9 : 7 Ratio)
ii) Supplementary factor (9 : 3 : 4 Ratio)
iii) Epistasis : Dominant, Recessive, Duplicate. (5 Periods)
3. Lethal Genes : Definition, concept, Coat colour in mice (2 : 1 Ratio) (2 Periods)
4. Linkage and crossing over :
i) Concept - complete and incomplete linkage,
ii) Crossing over - Mechanism of crossing over and its significance. (8 Periods)
5. Sex determination : Types : XX - YY method,
ZZ - ZW method, XX - XO method.
Environmental sex determination (Bonellia) (5 Periods)
6. Multiple Alleles : i) Definition, ii) Characteristics
iii) Inheritance of blood groups and its medico - legal applications,
iv) Coat colour in Rabbit. (5 Periods)
7. Polygenic Inheritance: Definition- Characteristics, skin colour in Man. (3 Periods)
8. Cytoplasmic Inheritance : Definition - examples - Kappa particle, Snail. (3 Periods)
9. Explain the terms : i) Eugenics, ii) Genetic counselling,
iii) Gene cloning, iv) Genetic engineering. (6 Periods)
-
- (40 Periods)

Theory question paper I - Nonchordates I and chordate I

Section I - Nonchordate I

- Q.1. Long answer type questions - 16 Marks.
OR
- Q.1 a,b,c. can be asked or long answer type can be asked. 16 Marks.
(5,5,6. Respectively)
- Q.2 Semi long questions - any two 16 Marks.
a) 5 marks, b) 8marks, c) 8 marks.

- Q.3. A) Notes on any two out of four. 12 Marks.
 B) Define/Explain/Compare/Sketch & label any three out of four 06 Marks.

Section II - Chordate I

- Q.4. Long answer type question. 16 Marks.

OR

- Q.4. a,b,c. can be asked or one long answer type can be asked. 16 Marks.
 (5,5,5. respectively)

- Q.5. Semi long questions any two. 16 Marks.
 a) 8 Marks, b) 8 Marks, c) 8 Marks.

- Q.6. A) Notes on any two out of four. 12 Marks.
 B) Define/Explain/Compare/Sketch and label, any three out of four. 06 Marks.

Theory question paper II - Environmental Biology and Genetics.

Section I - Environmental Biology

- Q.1.)
 Q.2.) As above
 Q.3.)

Section II - Genetics

- Q.4.)
 Q.5.) As above
 Q.6.)

Syllabus for Practicals at F.Y.Bsc. (Zoology)
 to be implemented from July 1997
 Practicals

Topic No.1. (C) Study of Taxonomic classification with binomial nomenclature of three animals from nonchordate and three from chordate. Taxonomic classification should include Phylum, class, order, genus, species

Nonchordate animals : Earthworm, lobster, pila, bivalve, scorpion, house fly, mosquito, starfish.

Chordate animals : Scoliodon, Labeo, Pomphret, frog or toad, any snake any blizzard any bird , any mammal.

Topic No.2. (D) Study of symmetry in following animals-
 1) Amoeba, 2) Hydra, 3) Jelly fish, 4) Earthworm, 5) Pila, 6) Starfish.
 7) any suitable vertebrate.

Topic No.3 (D) Study of following animals with reference to * body wall and coelome.

- 1) Hydra, 2) Sea-anemone, 3) Liverfluke/planaria/Tapeworm,
 4) Ascaris/Earthworm/Nereis/Leech.

*(Body wall includes Ecto, Meso and endo term, types of cellular composition is not expected.)

Topic No.4. (E) Dissection of Cockroach.

- 1) External characters, Sexual dimorphism.
 2) Study of following systems.
 a) Digestive system with salivary gland.
 b) Nervous system.
 c) Male and female reproductive system.

3) Temporary preparation of following.

- a) Mouthparts, b) Antennae of male & female, c) Legs, d) Wings,
- e) Salivary gland, f) Spiracles—Thoracic and Abdominal, g) Trachea,
- h) Spermatheca, i) Cornea, j) Striated muscles from coxa,
- k) Gizzard.

(D) 4) Observation of male and female - Gonapophysis, Heart and salary muscles, Ootheca.

Topic No.5. (D) Study of migratory animals with suitable model/chart/specimen. e.g. salmon.

Topic No. 6.(D) Study of parental care in following animals:

- 1) Sea horse, 2) pipa sp.with suitable model/chart/specimens.

Topic No.7.(D) Study of following systems from dissected frog -

- 1) Digestive system—Internal structure of Buccal cavity, Alimentary canal.
- 2) Respiratory system - Lungs.
- 3) Circulatory system - Heart with truncus arteriosus, two main aortic arches and three vena cavae close to heart.
- 4) Excretory system - kidney, ureter and urinary bladder.
- 5) Male reproductive system - Testis, vasa efferentia.
- 6) Female reproductive system - Ovaries, Oviduct, Cloaca.
- 7) Nervous system - Brain - Dorsal and ventral view, and spinal cord.

Topic No.8. (D) Study of developmental stages in frog -

Uncdaned egg, two celled stage, four celled stage, Blastula, Gastrula and various prominent stages of development in Tadpole larva.

(D) Demonstration.

(E) Experimental.

PRACTICALS

ENVIRONMENTAL BIOLOGY

- E 1) Estimation of O₂ and CO₂ from sample water.
- E 2) Study of fauna from given water sample.
- D 3) Experiment of Dust fall.
- D 4) Study of adaptations in animals with respect to following habitats : by showing suitable specimens.
 - 1) Aquatic -
 - 2) Terrestrial -
 - 3) Aerial -
 - 4) Arboreal -
 - 5) Cursorial -
 - 6) Fossorial -
 - 7) Symbiotic
 - 8) Commensals -
 - 9) Parasitic -
- D 5) Compulsory visit to any ecosystem.

GENETICS

- E 1) Study of human phenotypes - Cheeks - Dimple and Non - Dimple cheeks, ear lobes, Hair pattern (curly and smooth) tongue - Roller and Non-roller.
- E 2) PTC tasting expt.
- E 3) Simple example of Monohybrid, dihybrid backcross by using coloured beads.
- D 4) Study of Normal male and female Drosophila.
- D 5) Study of Mutants of Drosophila - White eye, bar eye, vestigial wings, sepia eye, Normal eye, curly wings.
- D Demonstration.
- E Experimental.

F.Y.B.Sc. Practical Course - Allotment of Marks.

1.	Dissection	20 Marks.
2.	Mounting	10 Marks.
3.	Environmental Biology	
	a) Any one experiment.	10 Marks.
	b) Study of Aquatic fauna. (Identification and ecological adaptations of minimum 3 forms are expected)	06 Marks.
4.	Identification of Nonchordates and chordate. (5 spots)	15 Marks.
5.	Identification of spots related to Environmental Biology. (3 spots)	09 Marks.
6.	Identification of spots related to Genetics. (4 spots)	10 Marks.
7.	Journal and Tour report.	10 Marks.
8.	Viva Voce.	10 Marks.
	Total -	100 Marks.

REFERENCE BOOKS

- 1) A Text book of Zoology - Invertebrate and Vertebrate Vol.1&2, 1992, 7th edition, Parker & Haswell, Edited By Marshall and William, CBS Publishers and distributors, New Delhi.
- 2) Life of Invertebrate, 1992, By S.N. Prasad. Published by Vikas Publishing House, New Delhi.
- 3) A text book of Zoology - Vertebrate, By S.N. Prasad. Published by Vikas Publishing House, New Delhi.
- 4) Invertebrate Zoology, E.L.Jordan. S.Chand & Company, New Delhi.
- 5) Vertebrate Zoology, E.L.Jordan, S.Chand & Company, New Delhi.
- 6) Invertebrate Zoology, 1992, 4th Edition Reprint, P./s Dhami and J.K. Dhami, R.Chand and Co. New Delhi.
- 7) Invertebrate structure and function. E.L.B.S. 2nd Edition 1979 E J.W. Barington.

- 8) The Invertebrate, 1967, L.A. Borradaile and F.A. Potts. Cambridge University Press.
- 9) Life of Vertebrates - 3rd Edition, 1983. J.Z. Young. ELBS, Oxford.
- 10) The frog. An Introduction to Anatomy, Histology and Embryology. 12th Edition 1956, A.M. Marshall, MacMillan & Co. Ltd., London.
- 11) The Biology of frog. 4th Revised edition, 1960. S.J. Holmes. The Macmillan Co. Ltd. New York.
- 12) The Biology of Amphibia, 1959. G. Kingsley Noble. Dover Publication Inc. New York.
- 13) Modern Text book of Zoology - Vertebrate, 1992, R.D. Kotpal. Rastogi Publication.
- 14) The Frog : Its Reproduction and Development. 1951, Robert Rugh. McGraw Hill Book Co. Inc. New York.
- 15) Development of the Frog. 1992, C.B. Pawar, Himalaya Publishing Company, Mumbai.
- 16) A Text Book of Chordate Zoology, 1988, R.G. Dalera, Jai Prakash Nath Publications, Meerut.
- 17) The Phylum Chordate, 1987, H.H. Newman, Distributor Satish Book Enterprise, Agra.

REFERENCE BOOKS
Paper II

- 1) Environmental Pollution - Causes, Effects and Control, 1991, Inderjeet Sethi, S.A. Equbal, Common wealth Publishers, New Delhi.
- 2) Environmental Biology, 2nd Edition, 1993, K.C. Agrawal, Agro Botanical Publishers, Bikaner, India.
- 3) Pollution of our Atmosphere, 1984, Dr. Henderson. Sellers University of Salford.
- 4) Impact of Environment. 1995. I.V. Trivedi.
- 5) Water Life and Pollution. 1990. Purohit, Saxena. Agro Botanical Publishers - Bikaner, India.
- 6) Environmental Problems, Prospects and Constraints, 1992. R.N. Trivedi, Anmol Publication, New Delhi.
- 7) Applied Environmental Biology - Resources and Management. 1990. M.M. Saxena, Agro Botanical Publishers - India.
- 8) Environmental Protection and Law 1994, P.R. Trivedi & V.K. Singh. Common Wealth Publishers. New Delhi.
- 9) Concept of Ecology 3rd Edition, 1986, E.J. Kormonday.
- 10) Text Book of Ecology - by Virbala Rastogi.
- 11) Fundamentals of Ecology 3rd Edition - by Odum E.P. Published By Sanders College Publishing.
- 12) Zoogeography - by Darlington.
- 13) Ecology - by South week.

- 14) Dynamic Zoogeography (W.R.T. Land Animals) by Miklos D.F. Udvardy
Published by Van Nostrand Reinhold Co. New York.
- 15) Animal Ecology by A.S. Pearce, McGraw-Hill Book Co. New York.
- 16) Animal Adaptation by Allison L. Burnett and Thomas, Modern Biology
Series. Elsner.

REFERENCE BOOKS (Genetics)

- 1) Principles of Human Genetics, 1968, Curt stern. Eurasia Publishing
House, New Delhi.
- 2) Cytogenetics, The Chromosome in Division, Inheritance & Evolution
1982, Carl.P. Swanson, Timothy mer Z, William, J. Young. Prentice Hall-
of India, New Delhi.
- 3) Introduction to Genetics, 1991. T.S. Gopalkrishna, Dr. Itta Sambasiviah
& Dr. A.P. Kamalara Rao, Himalaya Publishing House, Bombay.
- 4) Theory and Problems of Genetics, 1983, William D. Stansfield, Schaum's
out line series, McGraw - Hill Book Company, New Delhi.
- 5) Principles of Genetics, 1990. Edmund W. Sinnott, L.C. Dunn &
Theodosius Dobziansky. Tata McGraw - Hill Publishing Co. New Delhi.
- 6) Fundamentals Of Genetics, 1990. B.D. Singh. Kalyani Publishers, New
Delhi, Ludiane.
- 7) The Science of Genetics, 1983, George, W. Burns and Paul, J. Bottino,
MacMillan Publishing Company, New York. Colliers MacMillan
Publishers, London.
- 8) Cytology and Genetics, 1990, V.R. Dnyansagar, Tata MacGraw - Hill
Publishing Company, New Delhi.
- 9) The Science of Genetics An Introduction to heredity, 1976, George W.
Burns, MacMillan Publishing Co. Inc. New York.
- 10) Cytogenetics and Evolution, 1988, R.S. Shukla and P.S. Chandel. S.
Chand and Company (Pvt) Ltd. New Delhi.
- 11) Genetics, 1990, C Sarin. Tata McGraw-Hill Publishing Co. New Delhi.
- 12) Genetics, A survey of the Principles of heredity, 1967, A.M.
Winchester, Oxford and IBH Publishing Co. New Delhi, Bombay.
- 13) Essentials of Cytology, 1983, C.B. Pawar, Himalaya Publishing House
Bombay.
- 14) Principles of Genetics, 1972, Eldon. J. Gardner Wiley Eastern, New
Delhi.
- 15) Genetics, 1975, Prem Singh Verma and Vinod Kumar Agarwal, S. Chand &
Co. (Pvt) Ltd. New Delhi.
- 16) Genetics, 1987, Mohan P. Arora and Gurdar Shah S. Sandhu. Himalaya
Publishing House, Bombay, Nagpur, Delhi.
- 17) A Text Book of Genetics, 1974, by Dr. R.C. Dalela and Dr. S.R. Verma,
Jai Prakash Nath & Co. Meerut.
- 18) Genetics, 1990, By Karvita. B. Ahluwalia. Wiley Eastern Ltd. New Delhi.
